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Interplay Between Surface Energy and Turbulent Kinetic Energy in Multiphase Homogeneous Isotropic Turbulence ROBERT CHIODI, OLIVIER DESJARDINS, Cornell University — Interactions between a liquid-gas interface and turbulence can have a significant effect on multiphase flows. Currently, models for this interaction are sparse, largely due to a lack of detailed understanding on how turbulent kinetic energy is exchanged with surface energy through surface tension. This talk will focus on this process through the use of direct numerical simulations of homogeneous isotropic turbulence surrounding an interface between two fluids of unity density and viscosity ratios. In particular, we will discuss the balance between the turbulent kinetic energy and energy stored in the interface surface. The length scales at which surface tension extracts and injects energy into the flow will also be analyzed through the use of a posteriori filtering of the simulation data. Additionally, probability density functions of interface curvature at different Weber numbers will be presented, and indicate that the most probable curvature in homogenous isotropic turbulence is well predicted by the Kolmogorov critical radius/Hinze scale.

Robert Chiodi
Cornell University

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